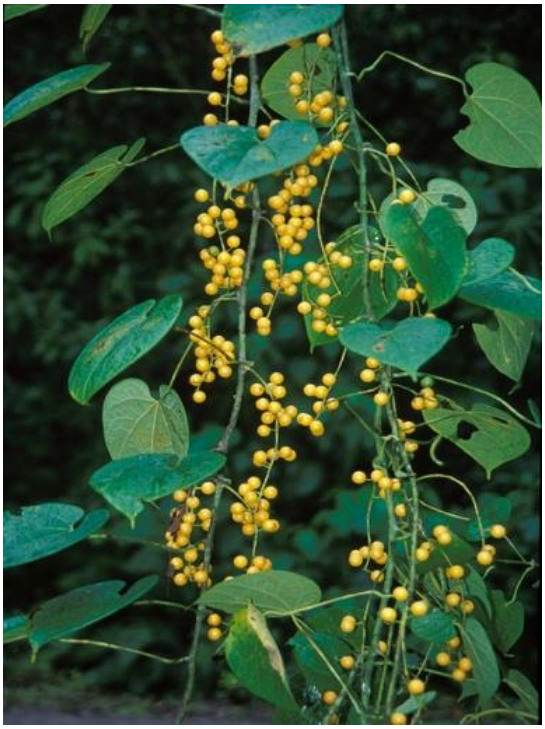
GUIDE TO THE GENERA OF LIANAS AND CLIMBING PLANTS IN THE NEOTROPICS

MENISPERMACEAE

By Rosa del C. Ortiz (Aug, 2022)



A pantropical family extending into sub-temperate zones in North America and Asia, with about 79 genera and ca. 523 species of twining lianas, or vines, less often shrubs or herbs. Of the 17 genera and about 200 species found in the Neotropics, ca. 173 species are climbers. *Hyperbaena* is the only neotropical genus where the climbing habit is not predominant, out of 22 species 4–5 are climbers. The family is most diverse in lowland humid forests, but some species may reach up to 2,300 m elevation, and some are found in deciduous to dry forests.

Diagnostics: Dioecious (rarely monoecious), twining lianas or vines with alternate, exstipulate, simple, entire leaves, palmatilobed or digitated in some species of *Disciphania;* venation often 3–5-palmativeined (plinerved), but pinnatinerved in *Telitoxicum* and in some species of *Hyperbaena* and *Odontocarya;* petioles glandless and pulvinate on both ends. Menispermaceae may be confused with *Ampelozizyphus amazonicus* (a climber in the Rhamnaceae), from which it is easily distinguished by its pulvinate petioles and the predominance of wide rays in the xylem. *Plukenetia volubilis* (Euphorbiaceae) is sometimes confused with Menispermaceae but it is distinguished by the presence of basal laminar glands, stipules, and dentate leaf margins. In addition, *Aristolochia* (Aristolochiaceae), *Dioscorea* (Dioscoreaceae), and *Sparattanthelium* (Hernandiaceae) are sometimes confused with members of Menispermaceae due to their similar palmate leaf venation. *Dioscorea*, however, is

distinguished by the acrodromous venation and the presence of an atactostele (vs. actinodromous venation (sometimes acrodromous in *Abuta grandifolia*) and siphonostelic stems in Menispermaceae); *Aristolochia* often has leafy pseudo stipules, petioles aren't distally pulvinate, and stems never have successive cambia; whereas *Sparattanthelium* is distinguished by its stipulate leaves, with non-pulvinate petioles, scrambling habit (not twining), and inconspicuous rays in the xylem.

General Characters

1. STEMS. Woody with subtantial secondary growth or less often herbaceous; in woody taxa reaching 15 to 20 (30) cm in width, and as many as 40 m in length (e.g., *Abuta, Anomospermum, Caryomene, Curarea, Elephantomene, Telitoxicum*); in herbaceous taxa reaching a few cm in diam. and 2 to several m in length. Stems are cylindrical, subcylindrical or less often flattened (figs. 1a–e), sometimes moderately furrowed in species of *Abuta.* Cross sections, especially of large lianas, with ***successive cambia*** that give rise to successive bands of xylem and phloem that are separated by connective tissue and radially dissected by multiseriate, wide rays (fig. 1b & d; 2a). The successive bands are either concentric (e.g., *Anomospermum* (figs. 1d) or unilateral (e.g., *Curarea barnebyana* R. Ortiz, *Curarea tecunarum* Barneby & Krukoff, *Sciadotenia toxifera* Krukoff & A.C. Sm.*;* fig. 1e); and rays aren't continuous from one ring to the next. In herbaceous species, the vascular cylinder is commonly dissected into ***radial plates*** by multiseriate wide rays (fig. 1a). A few species are known to have wood that oxidazes yellow (*Abuta obovata* Diels, *A. rufescens* Aubl., and *Anomospermum reticulatum* (Mart.) Eichler), purplish in *Anomospermum schomburgkii* Miers, or lavender in *Anomospermum chloranthum* Diels.

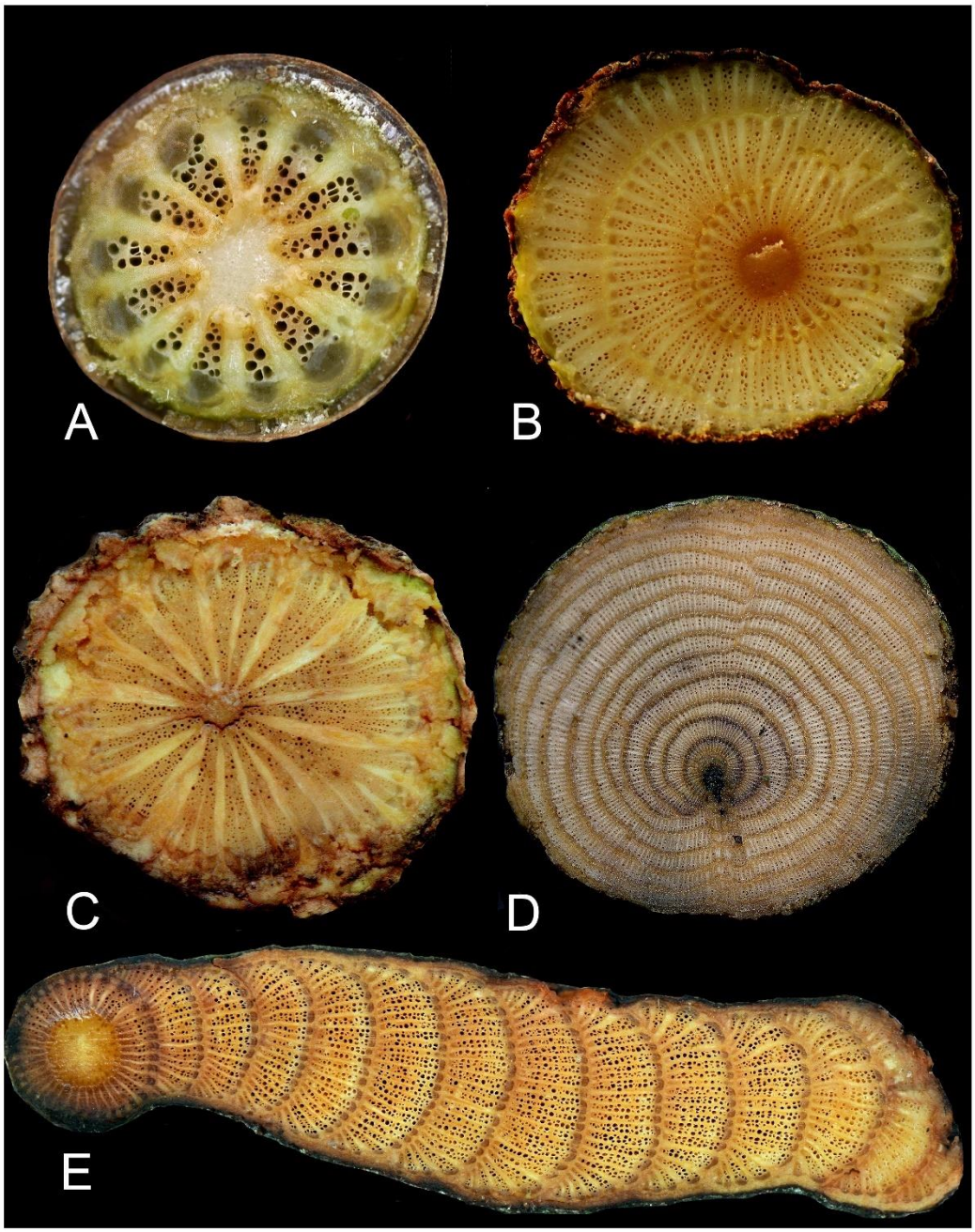


Figure 1. Cross sections of stems. **A**. *Odontocarya* sp., single cambium with vascular tissue radially dissected by wide rays, phloem accompanied on the ouside by a fibrous cap **B**. *Hyperbaena hassleri*, nearly cylindrical with successive concentric rings of vascular tissue. **C**. *Cissampelos pareira,* nearly cylindrical, with single cambium, vascular tissue disected by wide rays into radial plates. **D**. *Anomospermum* sp., cylindrical stem with concentric rings of vascular tissue. **E**. Menispermaceae indet.,flat stem with successive cambia with unilateral production of xylem and phloem bands. Photos by P. Acevedo.

Figure 2. Cross sections of *Anomospermum* sp. stem, close up of successive rings separated tangentially by sclerenchyma cells and radially by wide rays. Photo by P. Acevedo.

2. EXUDATES. Exudates for the most part are watery and colorless, however, in species of *Odontocarya* and *Disciphania calocarpa* Standl. the exudate can be milky white or cream.

3. CLIMBING MECHANISMS. Most climbing Menispermaceae are ***twiners*** (e.g., most species of *Abuta, Anomospermum, Cissampelos, Hyperbaena, Odontocarya;* (fig. 3a), while a few species are known to be ***scramblers*** (e.g., *Abuta, Sciadotenia*), or to produce ***tendril-like stems***, i.e., short, sympodial twining stems (e.g., *Abuta imene* (Mart.) Eichler and *Telitoxicum* sp.; (fig. 3b).

4. LEAVES. Leaves are spirally arranged, simple, entire or less often lobed or digitate (figs. 4a–d), coriaceous or chartaceous with entire margins; venation commonly 3–5-palmati-nerved (fig. 4c), sometimes with secondary veins developing above the midleof the blade (fig. 4c), and tertiary veins conspicuously scalariform or less often reticulate, less frequently they are pinnately veined (e.g., *Telitoxicum* and some

Hyperbaena and *Odontocarya*), basifixed or peltate (fig. 4d); base obtuse, rounded or sometimes cordate. Petioles are eglandular, the ones directly exposed to the sun and/or higher up in the canopy are short, whereas long petioles are common in plants in the understory. The petioles are pulvinate on both ends, usually the distal one more conspicuously so and often geniculate, the basal one sometimes twisted (e.g., *Disciphania,* fig. 4d; cf. *Odontocarya,* fig. 5b), sometimes the distal/apical one displaying the blade at an acute angle (figs. 5a, c).

5. STIPULES AND STIPELS. Stipules and stipels are absent.

6. INFLORESCENCES. Inflorescences are axillary, supra-axillary, terminal or sometimes cauliflorous (e.g., *Curarea toxicofera* (Wedd.) Barneby & Krukoff and *Chondrodendron tomentosum* Ruiz & Pav.) racemes/subracemes, panicles or spikes (figs. 6a–c), condensed corymbs in a pseudoraceme (sensu Barneby 2001) or sometimes solitary flowers; frequently the staminate inflorescences multiflorous and the pistillate ones pauciflorous; flowers bracteate, born singly or fasciculate along the inflorescence axes.

7. FLOWERS. Small (0.6–4 mm), or less often large (up to 9 mm in some species of *Disciphania*), frequently greenish, yellowish, whitish, or pinkish/salmon-colored in *Disciphania* (fig. 6c). Flowers are unisexual (the plants dioecious, rarely monoecious in *Disciphania spadicea* Barneby,) and radially symmetrical (bilaterally symmetrical in pistillate flowers of *Cissampelos*); perianth in series of 3; sepals 6–many imbricate or valvate, free, partially or fully fused in some species of *Disciphania*; petals free, 6 or wanting; in *Cissampelos* the perianth is 4-merous in the staminate flowers while pistillate flowers only have one sepal and one petal. Staminate flowers: stamens (3) 6 (12), (reduced to 1 in *Odontocarya monandra* Barneby), the filaments distinct or united into a column, anthers opening by longitudinal or transversal slits; pistillode absent, occasionally observed in *Anomospermum chloranthum* Diels. Pistillate flowers: staminodia sometimes present, then 3–6; ovary superior, apocarpous, (1)3(6)-carpellate, sessile, ovules 2 per carpel, with submarginal placentation, but

only one ovule develops, the styles distinct, stigma commonly linguiform, sometimes bi- or broadly lobulate, trifid in *Cissampelos*.

8. FRUITS, ENDOCARPS AND CONDYLES. Drupaceous monocarps/druplets (figs. 7a–d), sessile or elevated on elongated carpophores (e.g., some species of *Curarea*, *Elephantomene*, *Sciadotenia*, fig. 7d), sometimes attenuate towards the base forming a stipe (e.g., *Chondrodendron*), (carpophores and stipes may look similar to the untrained eye, however, the carpophore, a structure different from the fruit, is recognized by an abscission zone where it meets the drupelet, while the stipe is formed by the attenuation of the fruit towards the base, therefore there is no abscission layer); remnants of the style/stigma are basal, subapical or apical; exocarp thin or coriaceous; mesocarp fleshy or fibrous, at least when dried. Frequently only 1-2 reach maturity. Endocarps papyraceous, crustaceous, bony or woody, smooth or variously ornamented on the external surface, (figs. 8a–f), sometimes also on the internal surface as in *Caryomene* and in some species of *Anomospermum*, of diverse shapes, straight or navicular, curved, (figs. 8a–f) or spiral (outside the Neotropics). The curvature of the endocarp is better observed in longitudinal section as shown in figs. 9b–d. Condyles, i.e., the adaxial intrusion of the ovary wall into the seed cavity as a result of the differential growth of the adaxial (ventral) side as compared to the abaxial (dorsal) side of the ovary, is one of the main characteristics of the Menispermaceae, and one that has traditionally been used to classify the familiy. The effects of this development is very pronounced in most members of the sub family Menispermoideae. In this group, growth along the transverse axis (width/diameter) is larger than the longitudinal axis (length), the developed fruits are consequently broader than longer, the remnant of the style/stigma is frequently found near the base, and the seeds are variously curved. The condyle in this group has been broadly referred to as *Menispermum* condyle type or bilaterally compressed, which can be either laminiform or septiform (figs. 9b–d). Whereas in members of the subfamily Chasmantheroideae, growth along the transverse axis is less pronounced than along the longitudinal axis, developing fruits are longer than broader, the remnant of the style/stigma is found at or near the apex, and seeds are relatively straight and mostly abaxially (dorsally) convex and adaxially (ventrally) concave. The condyle here is

broadly characterized as *Calycocarpum* condyle type or convex condyles (fig. 9a), *Disciphania* lacks a condyle, both, the dorsal and ventral surfaces are mostly flattened (Ortiz 2012).

9. SEEDS, ENDOSPERMS & EMBRYOS. Seeds are straight or variously curved (figs. 10a–c, f); endosperm continuous, adaxially or completeley ruminate (figs. 10a–c), or absent (fig. 10f); embryo with fleshy or foliaceous cotyledons, appressed or divaricate (fig. 10), when endospem is absent cotyledons are very thick (fig. 10f).

Figure 3. Climbing mechanisms in Menispermaceae. **A**. Menispermaceae indet. with twining stems . **B**. *Abuta sp.* with tendril-like branches with determinate growth. Photos by P. Acevedo.

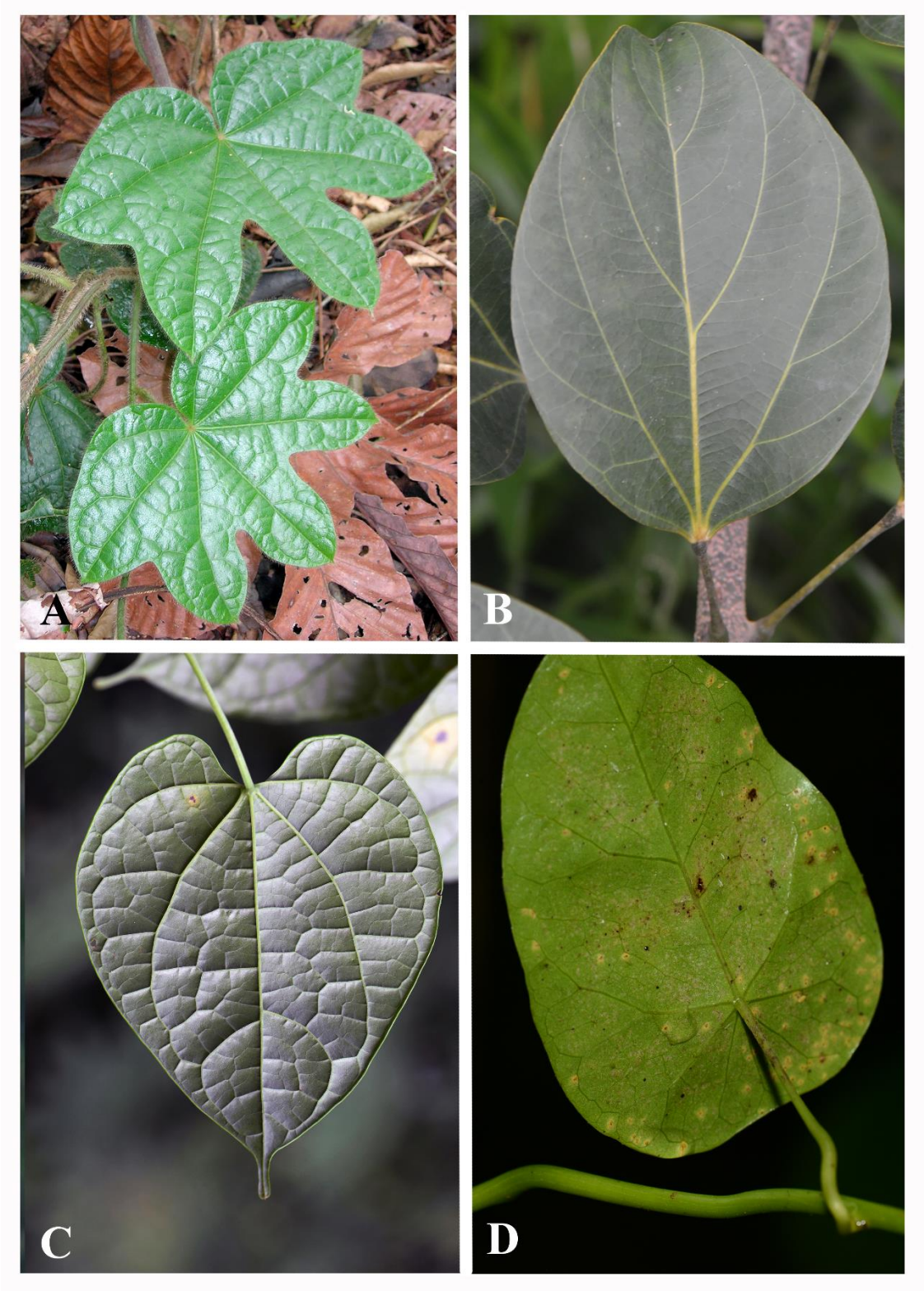


Figure 4. Leaves. **A**. Lobed and basifixed, palmatinerved in *Disciphania lobata*. **B**. Entire, ovate, basifixed, triplinerved veined in *Abuta* sp., petiole with conspicuous pulvinus on both ends. **C**. Entire, cordiform, basifixed, palmatinerved with tertiary reticulate venation in *Odontocarya* sp. **D**. Peltate, suprabasal palmatinerved in *Disciphania hernandia*. Photos: A by R. Ortiz; B–D by P. Acevedo.

Figure 5. **A**. *Elissarrhena longipes* with blade bent at an acute angle with respect to the petiole. **B**. *Disciphania domingensis*, petiole twisted at base. **C**. *Hyperbaena* sp., with short petioles that are geniculate at the apex, displaying the blade at an acute angle with respect to the petiole. Photos: A, C by P. Acevedo, B by R. Ortiz.

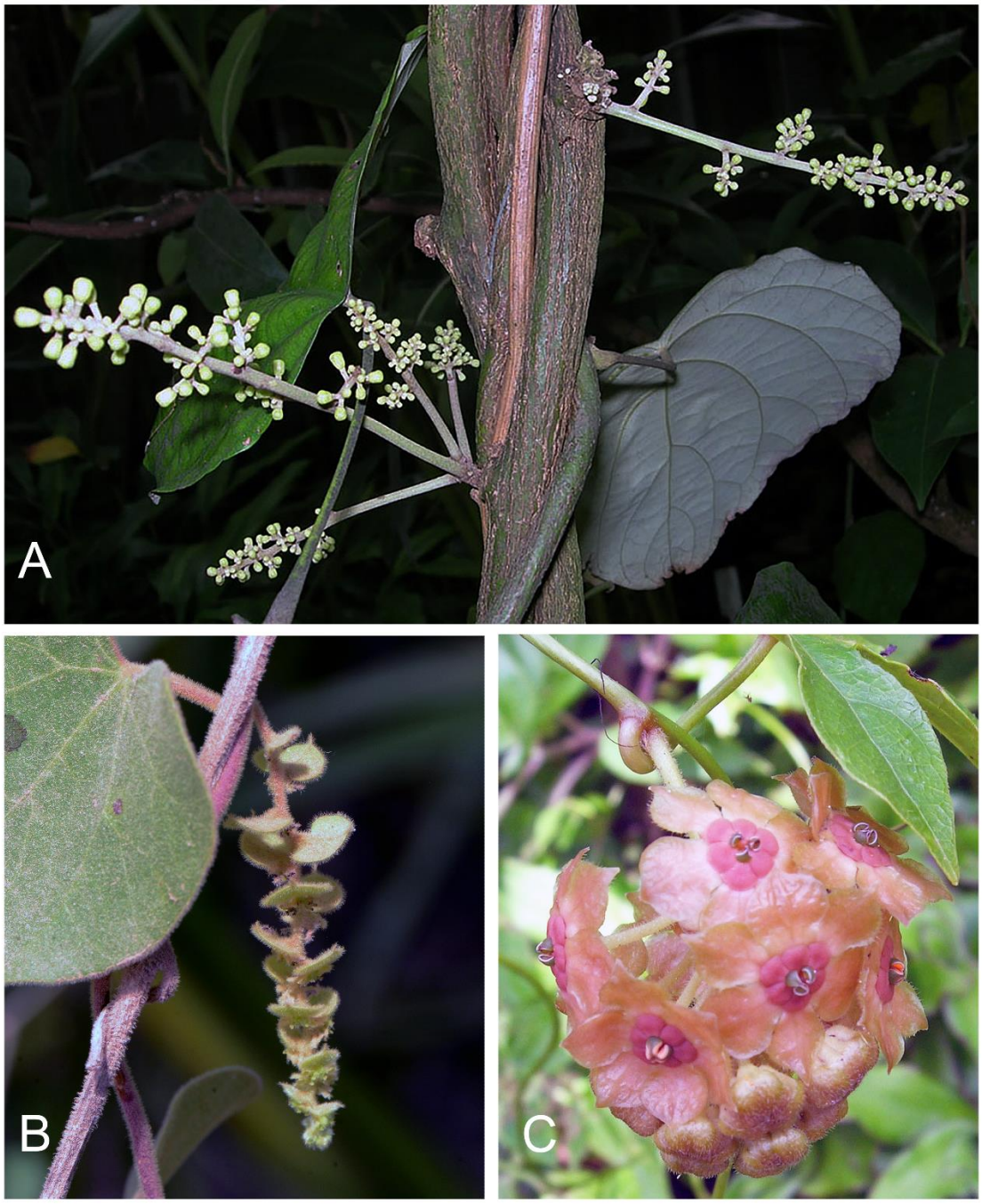


Figure 6. Inflorescences and flowers. **A**. Cauliflorous, paniculate staminate inflorescence in *Chondrodendron tomentosum*. **B**. Axillary, pseudoraceme with large bracts and flowers in fasciculate clusters in *Cissampelos pareira*. **C**. Axillary racemose staminate inflorescence in *Disciphania domingensis*. Photos: A & C by R. Ortiz; B by P. Acevedo.

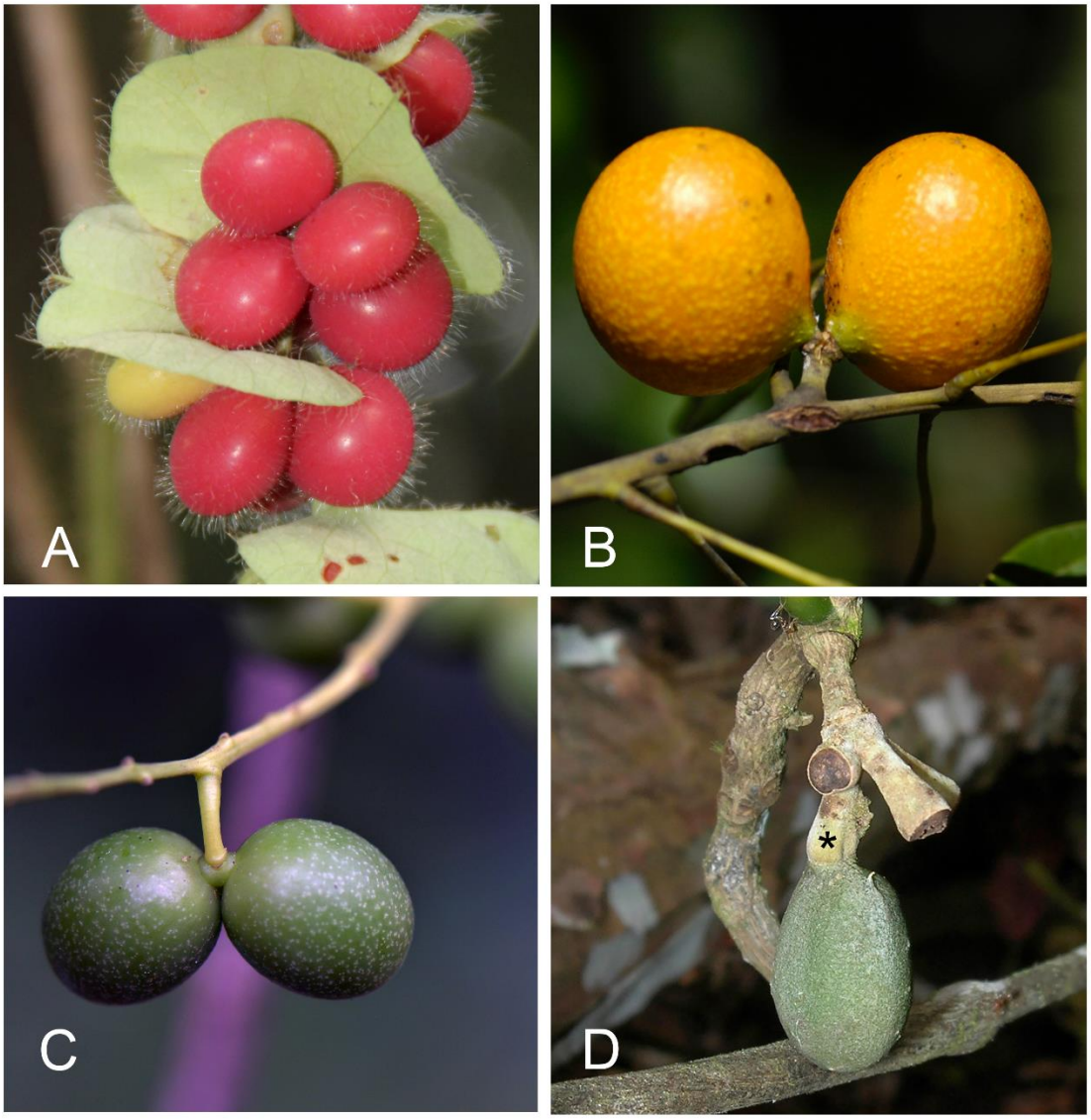


Figure 7. Fruits. **A.** Clusters of drupelets of *Cissampelos tropaeolifolia*, subtended by large, foliaceous bracts. **B**. Sessile drupelets from same flower in *Anomospermum* sp. **C.** A pair of drupelets from a same flower in *Odontocarya* sp. **D**. Single drupelet in *Sciadotenia mathiasiana* on elongate carpophore (black asterisk) and with basal remnant style/stigma, adjacent carpophores present. Photos: A–D by R. Ortiz; B–C by P. Acevedo.

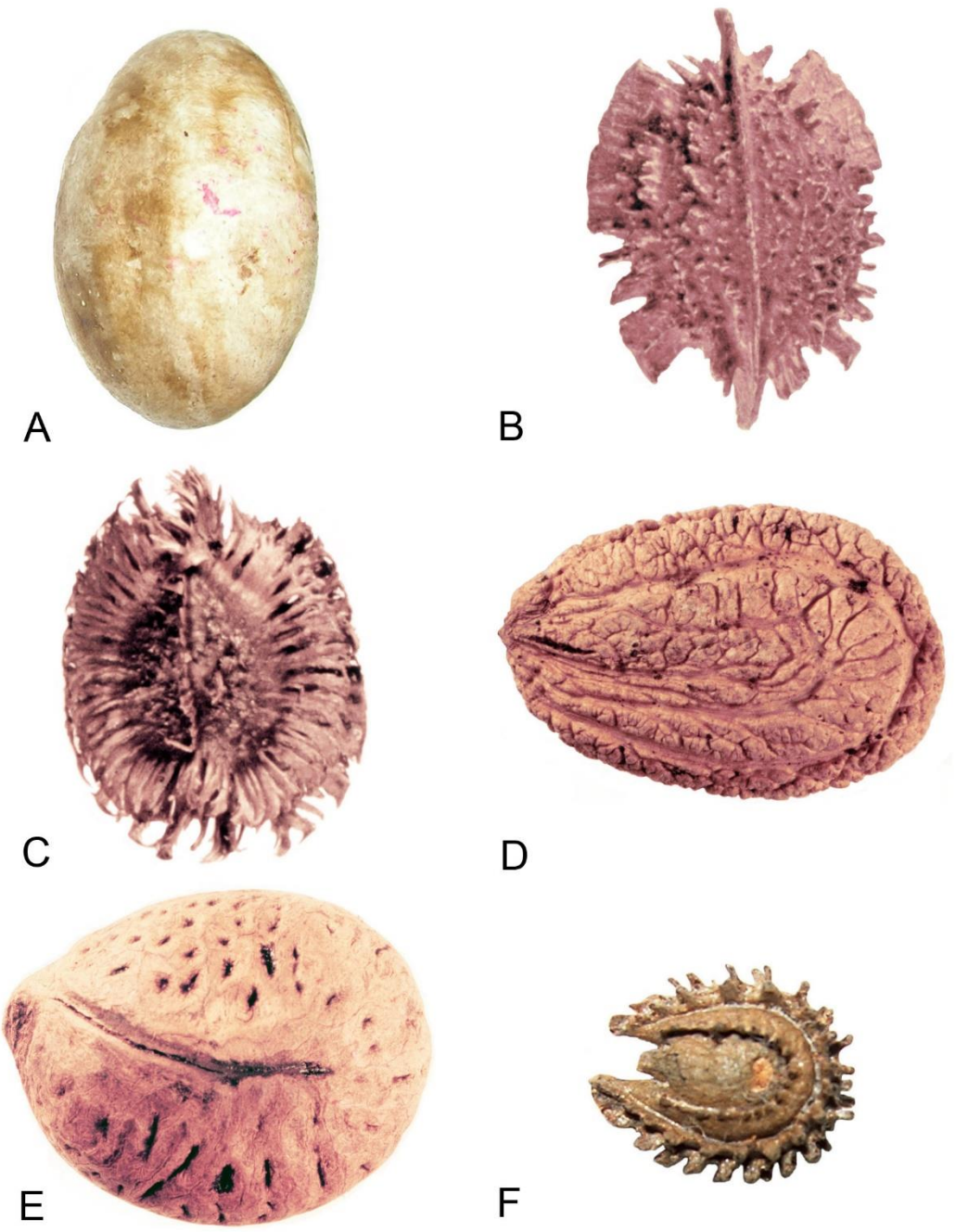


Figure 8. Endocarps. **A**. Smooth, papery and navicular in *Borismene japurensis*. **B**. Crustaceous, navicular, and variously ornamented in *Odontocarya perforata.* **C**. Crustaceous navicular and ornamented with fibers in *Disciphania smithii*. **D**. Woody with reticulate ornamentation in *Abuta panamensis*. **E**. Woody, perforated with variously shaped dimples in *Caryomene foveolata*. **F**. Crustaceous, horseshoe-shaped and conspicuously ornamented with conical and laminar protuberances in *Cissampelos andromorpha*. (A–B, dorsal view; C, ventral view, D–F, lateral view). Photos by R. Ortiz.

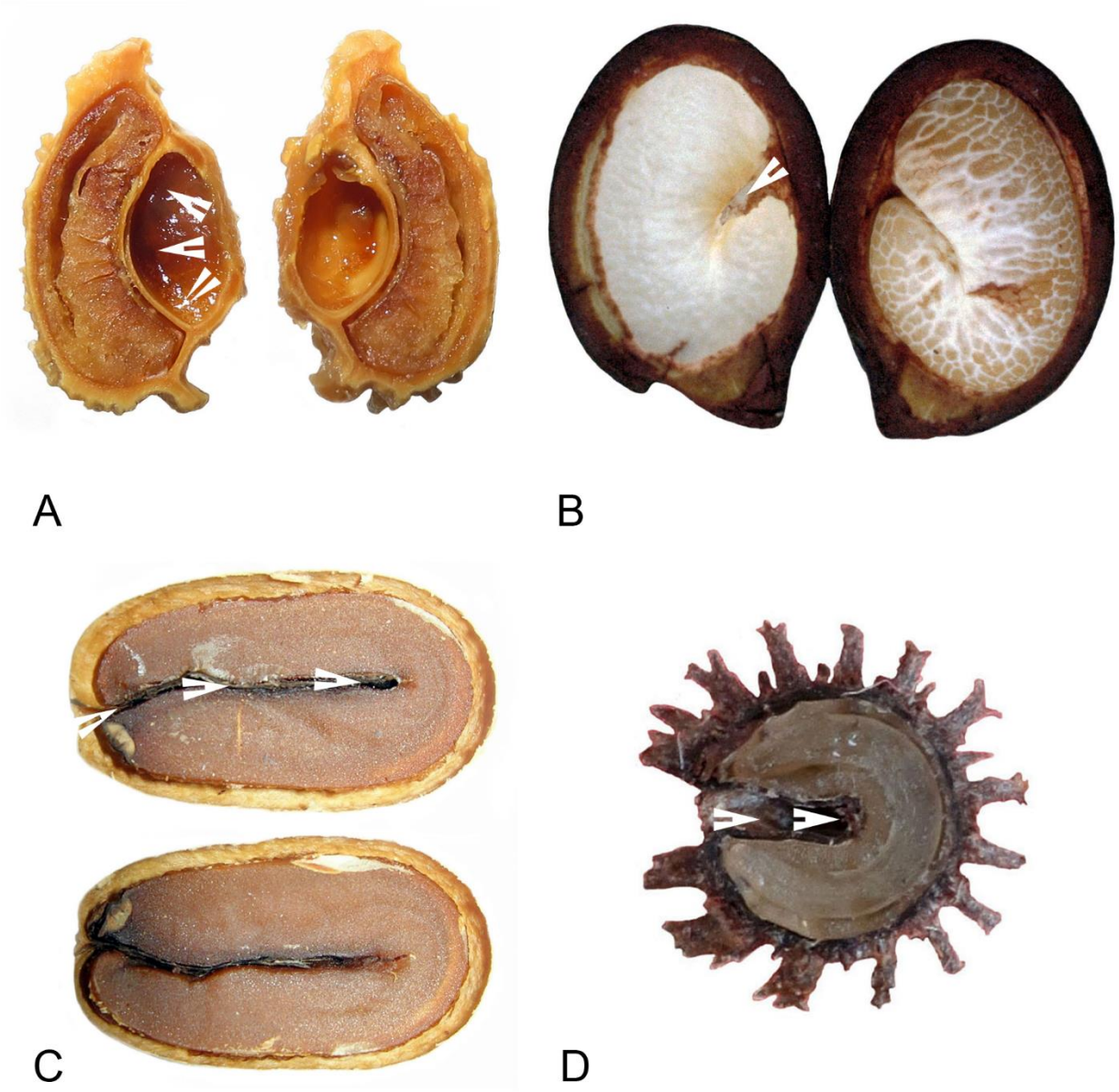


Figure 9. Intrusions or condyles (arrowheads) shown in longitudinal section of endocarps. **A**. Convex intrusion in *Odontocarya tripetala*. Bilaterally compressed intrusions: **B.** *Elissarrhena longipes*. **C.** *Curarea iquitana*. **D.** *Cissampelos tropaeolifolia*. Photos by R. Ortiz.

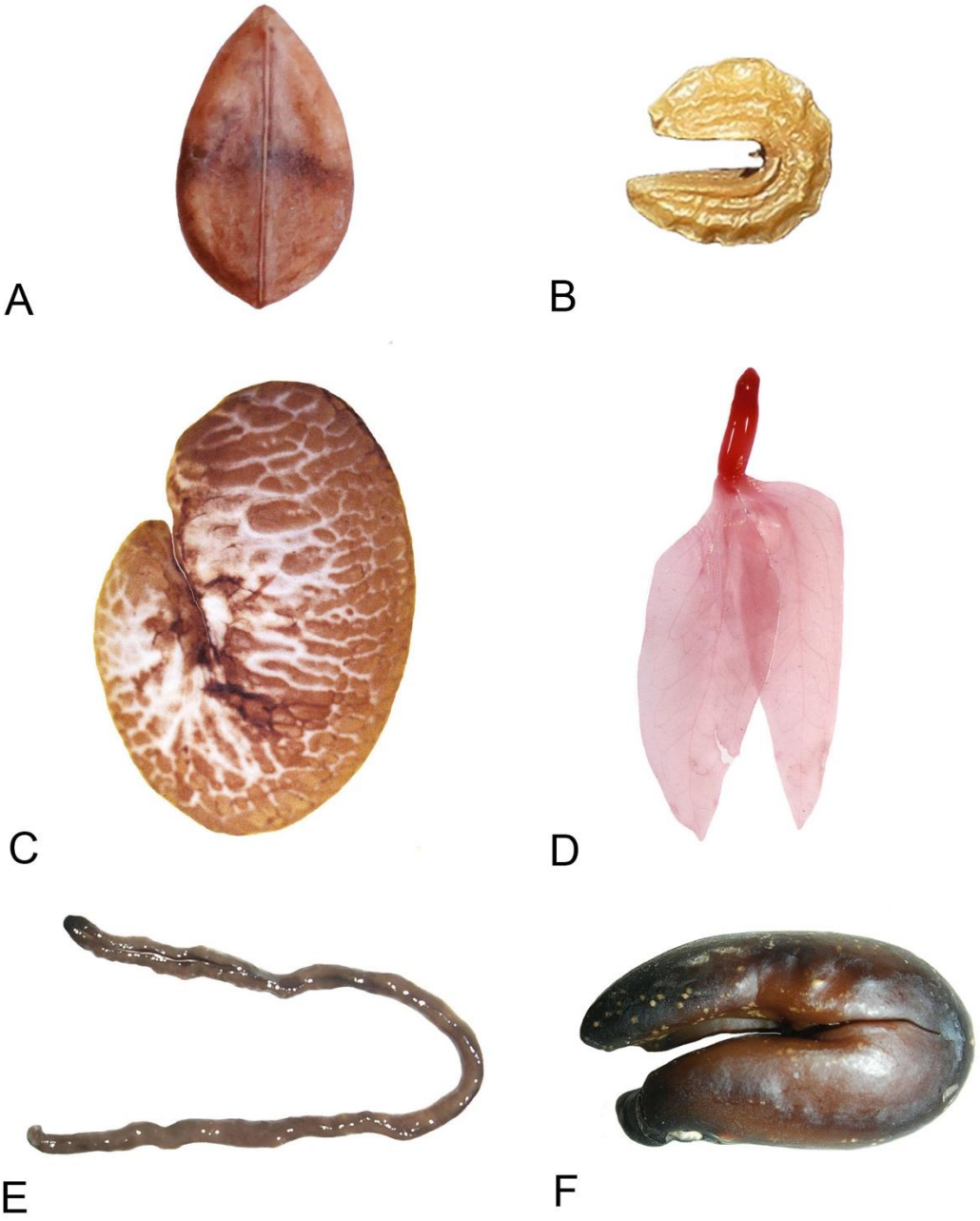


Figure 10. Seeds and embryos. **A.** Dorsiventrally compressed seed in *Disciphania smithii*. **B.** Bilaterally compressed, hippocrepiform seed in *Cissampelos tropaeolifolia*. **C.** Bilaterally compressed, "J-shaped" seed in *Elissarrhena longipes*. **D.** Foliaceous, divaricate cotyledons in *Odontocarya truncata*. **E.** Subterete, subfleshy cotyledons in *Abuta rufescens*. **F.** Fleshy cotyledons in *Chondrodendron tomentosum*. (**A,** ventral view; **B–C**, **E–F**, lateral view; **D**, dorsal view). Photos by R. Ortiz.

USES

Several species in *Abuta, Chondrodendron, Curarea, Cissampelos*, and *Telitoxicum* are reported as a source in the preparation of the South American arrow-poison or curare. Similarly, species in these genera are used in traditional medicine, among these *Abuta grandifolia* (Mart.) Sandwith is widely used in the Amazon basin. Edible fruits have been reported for *A. grandifolia*, *Disciphania calocarpa* Standl., and for *Odontocarya asarifolia* Barneby.

KEY TO THE GENERA OF CLIMBING MENISPERMACEAE

Key based on staminate plants

1. Perianth 4-merous, petals fused into a cupuliform or patelliform structure ..... ***Cissampelos***
1. Perianth 3-merous, petals free or absent 2
2. Sepals in (3)4 cycles or more forming a graduated cone..... ***Sciadotenia***
2. Sepals in 2–3 cycles, not forming a graduated cone 3
3. Petals absent (sometimes rudimentary in *A. chiapasensis* and in A. *panamensis*).....***Abuta***
3. Petals present, conspicuous.....4
4. Inflorescences in spikes, (rarely racemes), flowers salmon-pink colored .....***Disciphania***
4. Inflorescences paniculate, cymose paniculate or racemes, flowers variously colored but not salmon-pink 5
5. Old stems frequently with papyraceous, exfoliating bark ..... ***Odontocarya***
5. Old stems with persistent bark 6
6. Petals fleshy or sub-fleshy, margins strongly inflexed around the stamens .....***Anomospermum***
6. Petals membranaceous or moderately fleshy, not inflexed around the stamens 7
7. Leaves densely, silvery, light cream or brown pubescent abaxially 8
7. Leaves glabrous or moderately to sparsely pubescent abaxially 10
8. Inner sepals fused forming a solid column; primary and secondary leaf veins strongly raised abaxially .....***Elephantomene***
8. Inner sepals free; primary and secondary leaf veins only moderately raised abaxially.....9
9. Inner sepals sub-membranaceous, petaloid; secondary veins arising below lower half of the blade ..... ***Chondrodendron***

9. Inner sepals moderately fleshy, not petaloid; secondary veins arising above distal half of the blade ..... ***Curarea***

10. Inflorescences glabrous..... ***Borismene***

10. Inflorescences variously pubescent 11

11. Leaves conspicuously papillose-lepidote abaxially ..... ***Caryomene***

11. Leaves glabrous or pubescent but not papillose-lepidote abaxially 12

12. Inner sepals pubescent on both surfaces ..... ***Elissarrhena***

12. Inner sepals glabrous adaxially (if pubescent then connate, forming a solid column in *Elephantomene*).....13

13. Petals sparsely tomentulose on both surfaces ..... ***Rupertiella***

13. Petals glabrous on both surfaces… 14

14. Leaves pinnatinerved, distal pulvinus conspicuous ..... ***Telitoxicum***

14. Leaves palmatinerved, distal pulvinus inconspicuous 15

15. Sepals 9, petals with an adaxial callus ..... ***Ungulipetalum***

15. Sepals 6, petals without an adaxial callus.....16

16. Leaves variable in shape, ovate, ovate-lanceolate, linear, oblong, elliptic, the base sometimes lobed ..... ***Nephroia***

16. Leaves elliptic, ovate, or broadly oblong, never lobed at base ..... ***Hyperbaena***

Key based on pistillate plants

1. Flowers irregular, carpel 1 ..... ***Cissampelos***

1. Flowers regular, carpels > 1.....2

2. Seeds without endosperm 3

2. Seeds with continuous, adaxially ruminate or fully ruminate endosperm 6

3. Carpels 6 or more 4

3. Carpels 3 5

4. Drupelets conspicuously stipitate at base ..... ***Chondrodendron***

4. Drupelets obtuse at base, not stipitate, but elevated on elongated carpophores ..... ***Sciadotenia***

5. Carpels glabrous ..... ***Hyperbaena***

5. Carpels densely pubescent ..... ***Curarea***

6. Endocarps dorsoventrally compressed; embryo foliaceous, divaricate 7

6. Endocarps bilaterally compressed; embryo scarcely fleshy, appressed (unknown in *Ungulipetalum*) 9
7. Condyles absent .....***Disciphania***
7. Condyles present 8
8. Endocarps variously ornamented on the external surface ..... ***Odontocarya***
8. Endocarps smooth on the external surface.....***Borismene***
9. Endocarps bony 10
9. Endocarps woody or crustaceous 11
10. Endocarps oblong in outline .....***Elephantomene***
10. Endocarps obovate in outline .....***Caryomene***
11. Endocarps crustaceous, seed with continuous endosperm, embryo cochleate .....***Nephroia***
11. Endocarps woody, seed with fully ruminate endosperm, embryo hippocrepiform 12
12. Flowers without petals (rare present and rudimentary in *A. panamensis*) .....***Abuta***
12. Flowers with petals 13
13. Carpels with conspicuous, long styles .....***Ungulipetalum***
13. Carpels with short or obsolete styles 14
14. Seeds hippocrepiform, drupelet with remnant of style/stigma basal .....***Telitoxicum***
14. Seed ellipsoid or J-shaped, drupelet with remnant of style/stigma apical or subapical.....15
15. Petals glabrous on both surfaces .....***Anomospermum***
15. Petals pubescent on both surfaces (unknown in *Rupertiella*) 16
16. Leaves with veinlets moderately immersed on both surfaces ..... ***Elissarrhena***
16. Leaves with veinlets conspicuously reticulate on both surfaces .....***Rupertiella***

Key primarily based on vegetative characters

1. Short (≤ 5 m long), herbaceous, or soft-stemmed woody vines; stem cross section with a single cambium (except in *Chondrodendron*).....2
1. Medium size to large (≥ 10 m long), woody lianas; stem cross sections with successive cambia (some *Sciadotenia* with a single cambium) 8
2. Leaf blades peltate, or if sub-basal then frequently mucronulate at apex 3
2. Leaf blades sub-basal, or if peltate (e.g., *Disciphania peltata*) then inconspicuously mucronulate at apex 5

3. Leaves frequently broadly ovate, densely pubescent abaxially; inflorescences of both sexes usually with large, conspicuous bracts; fruits of a single drupelet ..... ***Cissampelos***

3. Leaves oblong, less frequently ovate, glabrous or sparsely pilosulous abaxially; inflorescences of both sexes (pistillate inflorescences unknown in *Ungulipetalum*) with small, usually inconspicuous bracts; fruits of many drupelets 4

4. Petioles 6-12 mm long; tertiary venation reticulate; staminate inflorescence a short, congested cyme (N to SW Mexico) ..... ***Nephroia***

4. Petioles 17-42 mm long; tertiary venation scalariform; staminate inflorescences a broad, lax cyme (SE Brazil) ..... ***Ungulipetalum***

5. Old stems usually with papyraceous, exfoliating bark ..... ***Odontocarya***

5. Old stems with persistent bark 6

6. Leaves broadly ovate, frequently cordate at base, sometimes lobed; inflorescences of both sexes usually spicate ..... ***Disciphania***

6. Leaves ovate, but obtuse or truncate at base, rarely shallowly cordate; pistillate inflorescence, staminate inflorescence paniculate 7

7. Leaves entire glabrous abaxially, secondary veins arising at or above the middle of the blade ..... ***Borismene***

7. Leaves often crenulate, abaxially silvery to cream tomentose, secondary veins arising below the middle of the blade ..... ***Chondrodendron***

8. Leaves conspicuously pinnatinerved ..... ***Telitoxicum***

8. Leaves conspicuously palmatinerved or only faintly pinnatinerved 9

9. Leaves broadly ovate to suborbicular, secondary veins arising below the middle of the blade ..... ***Elephantomene***

9. Leaves ovate, secondary veins arising above the middle of the blade 10

10. Leaves abaxially lepidote ..... ***Caryomene***

10. Leaves abaxially glabrous or variously pubescent, but not lepidote 11

11. Leaves with veinlets conspicuously prominent on both surfaces; branchlets and fruiting peduncle conspicuously lenticellate, especially when dried ..... ***Rupertiella***

11. Leaves with veinlets frequently immersed adaxially to moderately prominent or immersed abaxially; branchlets and fruiting peduncle not lenticellate, or only faintly so 12

12. Tertiary venation frequently continuous, conspicuously scalariform 13

12. Tertiary venation discontinuous, reticulate-scalariform 15
13. Pistillate flower with six carpels ..... ***Sciadotenia***
13. Pistillate flower with 3 carpels 14
14. Leaves silvery tomentellous or cream villose abaxially, sometimes indument restricted to areolae with age; pistillate inflorescence thyrsoid .....***Curarea***
14. Leaves glabrous to various densely pubescent abaxially, but not silvery or cream villous; pistillate inflorescence a raceme .....***Abuta***
15. Leaves 6.3-27 cm long; petioles 4-16 cm long..... ***Elissarrhena***
15. Leaves 3.4-12 cm long; petioles 1-4.9 cm long.....16
16. Leaves faintly palmatinerved or pinnatinerved..... ***Hyperbaena***
16. Leaves conspicuously palmatinerved or less frequently faintly pinnatinerved .....***Anomospermum***

IDENTIFICATION OF GENERA BASED ON VEGETATIVE CHARACTERS

Freshly cut stems: purple in *Anomospermum schomburgkii* Miers; yellow in *Abuta bullata* Moldenke, *A. obovata* Diels, *A. rufescens* Aubl., and *Anomospermum reticulatum* (Mart.) Eichler; lavender in *Anomospermum chloranthum* Diels.

White exudate: *Borismene japurensis* (Mart.) Barneby [*Mathias & Dermot 5023* (MO), *5078* (MO)]; *Disciphania calocarpa* Standl., *Odontocarya tamoides* (DC.) Miers; *O. tripetala* Diels (Krukoff & Barneby, 1970).

Successive cambia: *Abuta, Anomospermum, Caryomene, Chondrodendron, Curarea, Elephantomene, Elissarrhena, Hyperbaena, Rupertiella, Sciadotenia toxifera* Krukoff & A.C. Sm., and *Telitoxicum.*

Tertiary veins:

1. Conspicuously scalariform: *Abuta, Chondrodendron, Curarea, Elephantomene, Sciadotenia,* and *Telitoxicum.*

2. Reticulate: *Anomospermum, Borismene, Caryomene, Cissampelos, Disciphania, Elissarrhena, Hyperbaena, Nephroia, Odontocarya* (in some species reticulate-scalariform), *Rupertiella*, and *Ungulipetalum* (reticulate-scalariform)

Cauliflorous inflorescences: *Chondrodendron tomentosum, Cissampelos* (some species), *Curarea toxicofera*, *Odontocarya klugii* (A.C. Sm.) Barneby, *O. membranacea* (A.C. Sm.) R. Ortiz, *O. rusbyi* Barneby, and *O. wullschlaegelii* (Eichl.) Barneby.

GENERIC DESCRIPTIONS

ABUTA Aublet, Hist. Pl. Guiane 618. 1775.

Abuta imene (Mart.) Eichler, photo by P. Acevedo.

Twining lianas, sometimes scrambling, with short twining (tendril-like) branches, (a few species sometimes shrubby or arboreal, e.g., *A. grandifolia* (Mart.) Sandwith and *A. sandwithiana* Krukoff & Barneby), branchlets not or only faintly lenticellate; stems cylindrical and sometimes furrowed, or flattened, ribbon-like, some species reaching > 20 cm in diam. and > 25 m in length; cross section with successive cambia. Leaves chartaceous to subcoriaceous, entire, elliptic, ovate, or obovate, often displayed at acute angle in relation to the petiole, glabrous to variously densely pubescent abaxially, base obtuse, rounded or truncate, apex acute, acuminate or retuse, basifixed; 3–5-palmatinerved, secondary veins commonly arising from above half of the blade, tertiary veins scalariform; petiole usually long (especially in understory leaves), pulvinate on both ends. Staminate inflorescences narrowly paniculate, pseudoracemose or racemose, solitary or several together, axillary or supra-axillary; perianth orange, yellow, sepals 6, petals if present, rudimentary, free; stamens (3)6, filaments free or variously fused, often the outer three free, the inner three fused for about half of their length. Pistillate inflorescences mostly in racemes; perianth color as in staminate flowers; sepals 6, free; petals absent; staminodes 3–6; carpels 3, glabrous or densely tomentose, sessile on a subglobose torus; style long, stigma linguiform or broadly lobulate. Fruiting peduncles usually not lenticellate. Drupelets oblongoid to weakly obovoid, the remnant of the style basal; exocarp coriaceous, yellow when ripe, mesocarp fleshy,

endocarp oblongoid, weakly bilaterally compressed, scarcely ornamented on the external surface, smooth on the internal surface; seed and embryo hippocrepiform, endosperm fully ruminate, cotyledons subterete, moderately fleshy, appressed, condyle bilaterally compressed.

Distinctive features: Often large lianas, petioles with distal pulvinus very conspicuous, pistillate flowers with no petals, or these rudimentary in *A. panamensis* (Standl.) Krukoff & Barneby; drupelets oblongoid to weakly obovoid with the remnant of the style/stigma near the base, endocarp crustaceous or woody, scarcely ornamented by moderately engraved-reticulate veins on the external surface, smooth on the internal surface; seed and embryo hippocrepiform.

Distribution: A neotropical genus of 32 species of lianas, although *Abuta grandifolia* (Mart.) Sandwith, as it is currently understood, in addition to being a liana can be a scrambling shrub, an erect shrub, or even a tree; ranging from southern Mexico to Bolivia and Brazil, but more diverse in the Amazon basin and the Guianas; primary or secondary forests, lowlands to submontane forests up to about 2,270 m in elevation in Oxapampa, Peru, and in sub-deciduous forest in Chiapas, Mexico.

ANOMOSPERMUM Miers, Ann. Mag. Nat. Hist. ser. 2. 7: 36, 39. 1851.

Orthomene Barneby & Krukoff (1971).

Large twining lianas, flowering high up in the canopy, reaching ≥ 20 m in length; young branches pubescent to glabrous, lacking lenticles or faintly lenticellate, old stems cylindrical or flattened reaching up to 22 cm in diam.; cross section with successive cambia. Leaves chartaceous to coriaceous, elliptic or ovate to rhombic, entire, glabrous to pubescent abaxially, base acute to obtuse, apex acuminate, basifixed, 3–5-

Anomospermum schomburgkii Miers, photo by P. Acevedo.

palmatinerved, usually the outer most pair faint, secondary veins arising below the midlle of the blade, but sometimes inconspicuous, tertiary veins reticulate; petioles pulvinate on both ends, shorter on leaves directly exposed to the sun. Staminate inflorescences in pseudoracemes or panicles; flowers solitary or fasciculate along the inflorescence axis, or flowers borne along leafy or leafless young branches, solitary or in subcymose clusters; perianth yellow, green-yellow, pale green, or light orange. Sepals 6–9, free, in 2–3 unequal whorls, the inner ones larger than the outer ones; petals 6, free, fleshy, the lateral margins strongly inflexed and fully enclosing the opposite stamen, forming a compact pseudodics around the latter; stamens 6, filaments free, usually bent inwards, anthers dehiscing longitudinally, appearing transversal due to the bending of the filament. Pistillate inflorescences of solitary or paired flowers, axillary; perianth green. Sepals and petals as in the staminate flowers, petals glabrous on both surfaces; staminodes 6; carpels 3, glabrous, style short, stigma subulate or linguiform. Fruiting drupelets sometimes fainly lenticellate. Drupelets asymmetrically ovoid or ellipsoid, sessile on a subglobose torus, the style scar subapical or apical; exocarp coriaceous, orange or yellow when ripe; mesocarp fleshy, thin; endocarp asymmetrically ovoid or ellipsoid, woody or bony, slightly bilaterally compressed, the external surface smooth, rugulose or foveolate, the latter corresponding to conical projections on the internal surface; seed and embryo “J-shaped” or straight, endosperm fully ruminate; cotyledons subterete, sub-fleshy, appressed.

Distinctive features: Flowers with strongly fleshy petals that completely enclose the opposite stamens; drupelets with the style scar subapical or apical (in species formerly placed in *Orthomene*), and a bony or woody endocarp.

Distribution: A genus of nine species and five subspecies that are found from Nicaragua to Brazil and Bolivia, including Venezuela, French Guiana, Colombia, Ecuador, and Peru; lowland riparian forests to montane forests; 200–2,300 m.

BORISMENE Barneby, Mem. New York Bot. Gard. 22(4): 144. 1972.

Borismene japurensis, photo by R. Foster.

Twining, subwoody vines, 15–20 m in length; branchlets glabrous; old stems cylindrical, up to 4 cm in diam.; cross section with a single cambium, vascular elements dissected by wide rays. Leaves chartaceous to sub-coriaceous, entire, ovate, glabrous on both surfaces, base truncate, apex acuminate, basifixed, 5-palmatinerved (2 basal & 2 suprabasal veins), secondary veins usually arising at or above the middle of the blade, tertiary veins reticulate; petioles conspicuously pulvinate at both ends, and commonly twisted at base. Staminate inflorescences paniculate, usually clustered, axillary, glabrous; perianth light green. Sepals 9, membranaceous, serially unequal; petals 6, free, partly enclosing the opposite, free filaments; anthers with longitudinal dehiscence. Pistillate inflorescences racemose, usually clustered, glabrous; perianth color unknown. Sepals and petals as in the staminate flowers; carpels 3, glabrous, style obsolete, stigma lobed. Drupelets ellipsoid, sessile on a subglobose torus, remnant of the style apical; exocarp subcoriaceous, red when ripe; mesocarp fleshy; endocarp sub-ellipsoid, dorsoventrally compressed, papyraceous, smooth on both surfaces, the ventral intrusion convex; seed sub-ellipsoid, straight, ventral flattened and furrowed, folded lengthwise around the convex condyle; endosperm continuous, crustaceous; embryo straight, cotyledons foliaceous, divaricate.

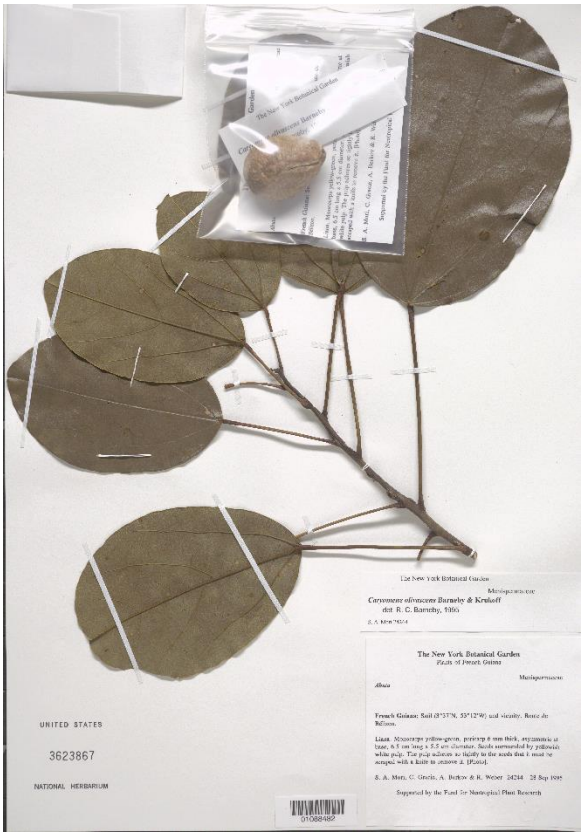
Distinctive features: Stem cylindrical, soft, with a single cambium. Drupelets straight, the remnant of the style/stigma apical; endocarp smooth, papyraceous, furrowed lengthwise

adaxially; endosperm continuous, crustaceous; embryo straight, cotyledons foliaceous, divaricate.

Distribution: A genus of a single species [*B. japurensis* (Mart.) Barneby] found from the Caribbean coast of Panama to Brazil, via the Pacific lowland in Colombia, eastern Venezuelan Guayana, Ecuador, Peru, and Bolivia; periodically flooded forests, lowland non-flooded primary forests to montane forests; 20–1,500 m.

CARYOMENE Barneby & Krukoff, Mem. New York Bot. Gard. 22(2): 52. 1971.

Large lianas; branchlets glabrous, old stems unknown; cross section with successive cambia. Leaves chartaceous to subcoriaceous, entire, ovate, papillose-lepidote abaxially, base obtuse, truncate to weakly cordate, apex acute to acuminate, basifixed, 3–5-palmatinerved, secondary veins arising above the middle of the blade, tertiary veins reticulate. Staminate inflorescences in cymules along axillary branches (in *C. grandifolia* Barneby & Krukoff), solitary or in pairs; perianth color unknown. Sepals 6, in two, similar whorls, membranaceous, unequal; petals 6, free, sub-fleshy, glabrous; stamens 6, filaments free, glabrous, anthers with longitudinal dehiscence. Pistillate inflorescences and flowers unknown. Drupelets obovoid, sessile on a subglobose torus, the remnant of the style/stigma near base; exocarp coriaceous, ripe fruits unknown; mesocarp fleshy; endocarp pyriform, moderately bilaterally compressed, bony, foveolate or ridged on the external surface, the internal surface with lamelliform projections that interdigitates the endosperm; seed hippocrepiform, molded by the projecting endocarp, folded



Caryomene olivascens Barneby & Krukoff, from Mori 24244 (US).

around the bilaterally compressed condyle; endosperm strongly fully ruminate, lamellae lacking individual integument (fide Barneby & Krukoff 1971, Barneby 2002), or present in *C. foveolata* Barneby & Krukoff*;* embryo hippocrepiform, cotyledons narrow, subterete [linear-vermiform, fide Barneby & Krukoff 1971], sub-fleshy, appressed.

Distinctive features: Leaves lustrous adaxially, papillose-lepidote abaxially; endocarp obovoid, foveolate on the external surface, the internal surface with lamelliform projections that interdigitates the endosperm.

Distribution: A genus of five or six species distributed in Colombia, Venezuela, [Guyana, Suriname, fide of Barneby 2001], French Guiana, Peru, Bolivia, and Brazil; non-flooded, moist forests; 100–300 m.

CHONDRODENDRON Ruiz & Pavón, Prodr. 132. 1794.

Large twining lianas or subwoody vines (e.g., *C. tomentosum* Ruiz & Pav.) to 16 m long; branchlets pubescent, old stems cylindrical up to 2.5 cm in diam.; cross section with successive cambia. Leaves chartaceous, entire, ovate, silvery to cream tomentose abaxially, basifixed, sometimes scarcely peltate, 3–5-palmatinerved, lowermost pair of secondary veins arising below the middle of the blade, tertiary veins scalariform or reticulate, the margin often crenulate; petioles

Chondrodendron platyphyllum (A. St. Hil.) Miers, photo by A. Popovkin.

with a conspicuous distal pulvinus. Staminate inflorescences cymose-paniculate, cauliflorous or axillary, usually fascicled; perianth green-yellow or yellowish. Sepals 9–18, membranaceous, the inner ones petaloid; petals 6, free, membranaceous; stamens 6, filaments free [or 3 and fused in *C. microphyllum* (Eichler) Moldenke], when free, the filaments (and the anther sacs) bent inwards and the connective is distally prolonged; anthers with longitudinal dehiscence, but appearing oblique or transverse due to the bending of filaments, when the stamens form a synandrium, the anthers are erect and the connective is not prolonged. Pistillate inflorescence racemose or paniculate, axillary or cauliflorous; perianth color as in staminate ones. Sepals and petals as in staminate flowers; staminodes absent; carpels 6, pubescent, style conduplicate, conspicuous, sigma subterete. Drupelets oblongoid, stipitate on a subglobose torus, the remnant of the style near the base; exocarp coriaceous, ripe fruits dark purple (e.g., *C. tomentosum*); mesocarp fleshy; endocarp oblongoid, bilaterally compressed, chartaceous, smooth or weakly ornamented by prominent veins on the external surface, smooth on the internal surface; seed hippocrepiform, folded around the bilaterally compressed condyle; endosperm absent, embryo hippocrepiform, cotyledons fleshy, appressed.

Distinctive features: Leaves moderately to densely silvery or cream tomentose abaxially; drupelets stipitate; endocarp oblongoid, weakly ornamented by prominent veins on the external surface, smooth on the internal surface.

Distribution: A genus of three species distributed from Panama to Bolivia and Brazil, including Colombia, Ecuador, and Peru; lowland, non-flooded forests, from about sea level in Panama up to 1,700 m in Cajamarca, Peru.

CISSAMPELOS Linnaeus, Sp. Pl. 1031. 1753.

Mostly small, subwoody, twining vines, rarely perennial herbs (*C. ovalifolia* DC.); branchlets glabrous or pubescent, old stems cylindrical; cross section with a single cambium (successive cambia reported in *C. pareira* L., fide Jacques & de Franceschi 2007), vascular

Cissampelos pareira L. photo by P. Acevedo.

elements dissected by very wide rays into radial plates (fig. 1c). Leaves membranaceous, chartaceous to subcoriaceous, entire, ovate, deltate or suborbicular, glabrous or pubescent on both surfaces, base rounded, truncate or cordate, apex acuminate, obtuse or retuse, mucronate, 5–12-palmately veined, margins entire or undulate; petioles conspicuously pulvinate at the base, less so at the apex. Staminate inflorescences dichasiate, axillary on adult leaves or on bracts arranged along axillary secondary branches, less frequent cauliflorous, frequently fasciculate; perianth greenish, yellowish green, or cream. Sepals 4(–6), free or shortly connate at base, membranaceous, equal; petals fused into a cupuliform or patelliform corolla (rare 2–4 and free, fide Standley & Steyermark 1946), sub-fleshy; stamens 4–9, connate into subsessile or stalked synandrium, anthers with transversal dehiscence. Pistillate inflorescences condensed corymbs in a pseudoraceme (Barneby 2001), arranged along racemiform or paniculiform axes, often bracteate; perianth colors as in staminate ones. Pistillate flowers bilaterally symmetrical: sepal 1; petal 1–2; staminodes absent; carpel 1, style conspicuous, stigma trifid. Drupelets subglobose or obovoid, sessile on a subglobose torus, remnant of the style/stigma near the base; exocarp membranous, ripe fruits frequently red; mesocarp fleshy; endocarp subglobose or obovoid, bilaterally compressed, crustaceous or somewhat woody, usually variously ornamented on the external surface with tubercles, conical projection or ridges, the ridges sometimes are conspicuously branched as in *C. tropaeolifolia* DC., less frequently the endocarp are weakly ornamented by low ridges as in *C. arenicola* M. Nee & R. Ortiz, the internal surface is smooth; adaxial intrusion sub-convex (fide Miers 1871); seed hippocrepiform; endosperm continuous, embryo hippocrepiform, cotyledons subterete, moderately fleshy, appressed.

Distinctive features: Staminate flowers with petals fused or coherent in a cupuliform or patelliform shape; pistillate flowers with a single carpel; endocarps ornamented by ridges, tubercles, or conical projections on the external surface, less frequently smooth.

Distribution: A Pantropical genus with about 24 species. In the Neotropics there are 11 species, most of them are widespread from Mexico to southern Brazil and the Antilles; disturbed forests, seasonally dry forests in the Chaco region, lowlands moist forest, and montane vegetation; 0–3,700 m

CURAREA Barneby & Krukoff, Mem. New York Bot. Gard. 22(2): 7. 1971.

Curarea sp., photo by R. Foster.

Large or medium-sized, twining lianas; branchlets pubescent, lacking lenticels, old stems sub-cylindrical or flattened, reaching 15 to 25 m in length and 30 cm in diam.; cross section with successive cambia. Leaves chartaceous to coriaceous, entire, ovate, oblong, elliptic or suborbicular, silvery tomentellous indumentum or brown-villous abaxially, base truncate or obtuse to rounded or slightly cordate, apex acute, acuminate, long-acuminate or mucronate, margins entire [weakly distally lobed in *C. candicans* (Rich. ex DC.) Barneby & Krukoff], basifixed or scarcely sub-peltate, 3–7-palmatinerved, secondary veins arising above the middle of the blade, tertiary veins scalariform. Staminate inflorescences solitary or fascicled, cauliflorous, axillary or terminal on young shoots, thyrsoid or a simple cyme; perianth whitish, greenish, cream, light orange or light brown. Sepals 6–9, in 2 or 3 unequal whorls, moderately fleshy, not petaloid; petals 6, free, in 2 more or less similar whorls, smaller than the inner sepals, membranaceous, partially clasping the

opposite filaments; stamens 3–6, in 1 or 2 similar whorls, filaments free or variously connate, anthers with longitudinal dehiscence, the connective thick adaxially and variously protruding. Pistillate inflorescences axillary or cauliflorous (e.g., *C. toxicofera*), thyrsoid; perianth greenish, yellowish or light brown. Sepals 6–9, in 2 or 3, unequal whorls; petals 3–6, free; staminodes absent; carpels 3(4), densely pubescent, style tapering towards a linguiform stigma. Fruiting pedicels lacking lenticels. Drupelets oblongoid, ellipsoid, broadly obovoid or subglobose, yellow when ripe, sessile on usually elongated carpophores, the remnant of the style/stigma near the base; exocarp coriaceous, sometimes conspicuously muriculate; mesocarp fleshy; endocarp oblongoid, slightly bilaterally compressed, papyraceous or crustaceous, weakly ornamented by impressed veins along its long axis on the external surface, less frequently with transverse ribs, smooth on the internal surface; seed without endosperm, folded around a bilaterally compressed, septiform condyle; embryo hippocrepiform, cotyledons fleshy, appressed.

Distinctive features: Leaves densely pubescent abaxially; endocarps papyraceous or crustaceous, weakly ornamented by ribs along the long axis on the external surface.

Distribution: A genus of nine species distributed from Costa Rica to Brazil, including Panama, Colombia, Ecuador, Peru, Venezuela, Guyana, Suriname, and French Guiana; non-flooded or periodically flooded forests, lower montane forests; 60–580 (–1,300) m.

DISCIPHANIA Eichler, Flora 47: 387. 1864.

Subwoody, slender, twining vines; branchlets glabrous, pilosulous or hirtellous; old stems cylindrical, reaching 20–30 m in length (Carrillo et al 2013); bark suberous with age; cross section with a single cambium. Leaves membranaceous, chartaceous to subcoriaceous, entire, variable in shape, palmately lobed or palmately 3–5-foliolate, glabrous to pubescent abaxially, base rounded, truncate, cordate or hastate, basifixed or peltate; palmately veined or radiate,

Disciphania hernandia (Vell.) Barneby*;* photo by P. Acevedo.

sometimes pinnately veined, tertiary veins reticulate; petiole conspicuously pulvinate and twisted proximally, less so distally. Staminate inflorescences supra axillary, less frequently cauliflorous, mostly spicate or paniculate, less frequently racemose, solitary or paired; flowers sessile, rarely pedicellate; perianth salmon-pink. Sepals 6, membranaceous or scarcely fleshy, free or connate about half their length, subequal, ascending or rotate; petals 3 or 6, sometimes obsolete, fleshy and forming a pseudo disc (with free or coherent margins) or free and erect, membranaceous; stamens 3 or 6, filaments free, frequently conspicuously broadened distally, connective broad, anthers longitudinally or obliquely dehiscent. Pistillate inflorescences spicate or racemose; perianth salmon-pink. Sepals and petals as in staminate flowers; staminodes absent; carpels 3, glabrous, style conspicuous or obsolete; stigma sub-peltate or variously lobed. Drupelets oblong-ellipsoid or subglobose, weakly dorsoventrally compressed, sessile on a subglobose torus, the remnant of the style apical; exocarp subcoriaceous, red or dark purple when ripe; mesocarp fleshy; endocarp ellipsoid, dorsiventrally compressed, straight, cartilaginous or crustaceous, ornamented by 8 (i.e., 3 on the dorsal surface, 2 on the lateral-marginal surface, and 3 on the ventral surface) ribs or wings, or carinate lengthwise on the external surface, smooth internally; condyle absent; seed ellipsoid, dorsiventrally compressed, straight, with continuous endosperm; embryo straight, the cotyledons foliaceous, divaricate.

Distinctive features: Staminate and pistillate flowers salmon-pink; endocarps straight, dorsiventrally compressed and ornamented by ribs or wings on the external surface; condyle absent.

Distribution: A genus of about 25 species, distributed from southern Mexico to SE Brazil, Bolivia, and Paraguay, through Colombia, Venezuela, French Guiana, Ecuador, and Peru, including the island of Hispaniola in the Greater Antilles. The genus is more diverse in the upper Amazon but is also found along the eastern foothills of the Andes, the Pacific coast of Ecuador and Colombia, and the Caribbean coast of Colombia and Venezuela; periodically flooded forests, non-flooded lowland forests, sub-deciduous forests, and cloud forests; 0–1,000 (1,900) m.

ELEPHANTOMENE Barneby & Krukoff, Lloydia 37(1): 27. 1974.

Cionomene Krukoff (1979).

Large twining lianas reaching up to 40 m in length; branchlets minutely puberulent; stems cylindrical reaching 10 cm in diam.; cross section in old stems with successive cambia. Leaves coriaceous, entire, broadly ovate, or suborbicular, densely velvety-tomentulose abaxially, base subcordate, apex acute or sub-emarginate, basifixed, 3–5-palmatinerved, lower most pair of secondary veins arising from below the middle of the blade, midrib and secondary veins prominent abaxially, tertiary veins scalariform. Staminate inflorescences cymose-paniculate, supra-axillary, solitary or in pairs; flowers pedicellate. Sepals 6–8, moderately fleshy, unequal, the inner 3 fused more than half their length, forming a solid column; petals 6, free, sub-fleshy, the outer 3 loosely clasping the opposite filaments; stamens 6, filaments free, anthers with longitudinal dehiscence. Pistillate inflorescences racemose, supra axillary. Sepals 6, in two unequal whorls, densely pubescent abaxially and at the distal half adaxially; petals 6, pubescent on both surfaces; staminodes 6, claviform, style short, stigma lobulate. Drupelets ellipsoid or oblongoid, sessile on shortly

Elephantomene eburnea, photo by R. Ortiz.

elongated carpophores, the remnant of the style/stigma near the base; exocarp coriaceous, ripe fruits yellow; mesocarp fleshy; endocarp oblongoid, bilaterally compressed, bony, smooth on both surfaces; seed hippocrepiform, folded around the bilaterally compressed condyle; endosperm strongly fully ruminate, embryo hippocrepiform, with elongated, subterete cotyledons, moderately fleshy, appressed.

Distinctive features: Leaves broadly ovate to suborbicular, coriaceous with subcordate base and primary and secondary veins prominently raised abaxially; large drupelets that are sessile on branched, elongated carpophores, and bony endocarps. Occasionally confused with *Abuta rufescens* Aubl., but that species has leaves that are rounded or obtuse at base, and the secondary veins usually arising above the middle of the blade.

Distribution: A genus of a single species (*E. eburnea* Barneby & Krukoff) known from French Guiana, Ecuador, Peru, and Brazil; non-flooded, primary forests; 100–670 m.

ELISSARRHENA Miers, Ann. Nat. Hist. ser. 3., 13: 124. 1864.

Large twining lianas; branchlets minutely pubescent, soon glabrate, lenticels absent or faint; cross section with successive cambia. Leaves chartaceous to subcoriaceous, entire, ovate, sparsely minutely sericeous to glabrous abaxially, basifixed, 3–5-palmatinerved, tertiary veins reticulate, veinlets immersed on both surfaces. Staminate inflorescences supra-axillary, cymose-paniculate (trichotomously corymbose, fide Diels 1910), frequently seriate, or 1–3 simple cymes along young branches, the cymes and the flowers subtended by conspicuous bracts in *E. solimoesana* (Moldenke) Wei Wang & R. Ortiz; perianth cream. Sepals 6, in two unequal whorls, moderately fleshy, tomentulose on both surfaces; petals 6, free, sub-fleshy, enclosing the opposite filaments; stamens 6, filaments free,

Elissarrhena longipes, photo by R. Ortiz.

anthers with longitudinal dehiscence, appearing transverse in *E. longipes* Miers due to the inward bending of filaments. Pistillate inflorescences and flowers unknown. Fruiting pedicels not or only faintly lenticellate. Drupelets ellipsoid, sessile on a globose torus, the remnant of the style/stigma subapical or apical; exocarp coriaceous, ripe fruits yellow; mesocarp fleshy; endocarp sub-ellipsoid, scarcely bilaterally compressed, woody, weakly ornamented by impressed veins, on the outer surface, these corresponding with low ridges in the inner surface; condyle bilaterally compressed, obliquely intruding to form a J-shape seed (fide Krukoff & Barneby 1970); endosperm strongly fully ruminate; embryo subterete, J-shaped, cotyledons linear, scarcely fleshy, appressed.

Distinctive features: Endocarp sub-ellipsoid, usually smooth or weakly ornamented by impressed veins on the outer surface, staminate flowers with sepals tomentulose on both surfaces.

Distribution: A genus of 2 species (*E. longipes* & *E. solimoesana*) distributed from Panama to Brazil including Guyana, Colombia, Ecuador, Peru, and Bolivia; wet forests at sea level in Panama and up to ca. 1150 m in premontane forests of Ecuador.

Taxonomic note: The genus *Elissarrhena* with the sole species *E. longipes* was described by Miers in 1864. In the same year, Eichler, described *Anomospermum grandifolium*, both names were based on the same type specimen (Spruce 1538). In his monograph of the Menispermaceae Diels (1910) kept the generic name *Elissarrhena* but used *grandifolium* as the specific epithet. *Elissarrhena* was later placed in synonymy of *Anomospermum* by Krukoff & Barneby (1970), and in 1971 as a section of the latter name to accommodate three species: *A. grandifolium*, *A. solimoesanum* and *A. bolivianum* (Barneby & Krukoff 1971) that shared the cymose or narrowly cymose-paniculate staminate inflorescences and staminate flowers with submembranaceous petals. More recently, Lian et al. (2019), reinstated *Elissarrhena* to accommodate *E. grandifolia* (Eichler) Diels and *E. solimoesana* and transferred *A. boliviana* into the new genus *Rupertiella*. However, as the epithet *longipes* was validated in the description of the monotypic genus *Elissarrhena* by Miers in February 1864, it predates the epithet *grandifolia* used by Eichler in July 1864. Therefore, *E. longipes* Miers has priority over *E. grandifolia* (K. Gandhi, pers. comm.).

HYPERBAENA Miers ex Bentham, J. Proc. Linn. Soc., Bot. 5. Suppl. 2: 47, 50. 1861, (nom. cons.).

Twining lianas, trees, erect or sometimes scrambling shrubs; branchlets glabrous to pubescent, lacking lenticels, old stems reaching 15–20 m in length and ca. 5 cm in diam.; cross section of old stems with successive cambia (even in arboreal and shrubby species). Leaves chartaceous to sub-coriaceous, simple, ovate, elliptic, oblong, base acute, cuneate, truncate, obtuse to weakly cordate, apex acute, acuminate, margins entire, basifixed, 3–5-palmatinerved or pinnatinerved, tertiary veins reticulate; petiole pulvinate at both ends. Staminate inflorescences supra axillary or axillary, lax or contracted panicles, solitary, serially or clustered, the secondary branches racemose or sub-cymose; perianth white, green, or yellow-green. Sepals 6, in two unequal whorls, membranaceous; petals 6, in two equal whorls, free, sub-fleshy, enclosing or not the opposite filaments, the latter mostly free; anthers with longitudinal dehiscence. Pistillate inflorescences axillary or cauliflorous, frequently solitary or serially, racemose to narrowly paniculate; perianth color as in staminate flowers. Sepals and petals as in staminate flowers; staminodes absent; carpels 3 (–5), glabrous, style short, stigma sub-terete to broadly-linguiform. Fruiting peduncle lacking lenticels. Drupelets subglobose to obovoid, weakly bilaterally compressed, sessile on a subglobose torus, the remnant of the style/stigma near base; exocarp coriaceous, fruits yellow, orange, bluish to reddish purple when ripe; mesocarp fleshy; endocarp subglobose or obovoid, crustaceous to woody, ornamented by low or conspicuous ridges on the external surface, smooth in the inner surface; condyle bilaterally

Hyperbaena domingensis (DC.) Benth., photo by P. Acevedo.

compressed; seed lacking endosperm; embryo hippocrepiform or semi annular; cotyledons fleshy, appressed.

Distinctive features: Endocarp subglobose to obovoid, weakly bilaterally compressed, externally ornamented by ridges along the outer curve, these with transversal ridges in-between, smooth on the internal surface; embryo with fleshy, appressed cotyledons.

Distribution: A genus of 22 species distributed from southern Mexico to Bolivia and Argentina, including Central America and the West Indies. Four species reported as twining vines or lianas, and two as sometimes scrambling shrubs; in swampy forests, gallery forests, dry forests, sub-Andean seasonal forests, and cloud forests; 0–2,000 m**.**

NEPHROIA Loureiro, Fl. Cochinch. 539, 565. 1790.

Small subwoody, twining vines or scrambling shrubs; branchlets cylindrical, puberulent to glabrous; stem with a single cambium. Leaves chartaceous to coriaceous, entire or occasionally lobed towards the base, ovate, ovate-lanceolate, linear, oblong, or hastate, base obtuse, rounded to cordate, or truncate, pubescent or glabrous on both surfaces, sometimes lustrous adaxially, apex obtuse, rounded, retuse, mucronate, acuminate, basifixed, 3–5-palmatinerved, tertiary veins reticulate; petioles pulvinate at both ends, more conspicuous so distally. Staminate inflorescences axillary or terminal racemes, racemose panicles or thyrses;

Nephroia diversifolia, photo by J. Brush.

perianth white, yellowish, or light green. Sepals 6–9 in 2–3, unequal whorls, membranaceous; petals 6, free, auriculate at base, entire at apex, membranaceous; stamens 6, free, anthers with longitudinal dehiscence, appearing transverse due to the bending of filaments. Pistillate inflorescences as in staminate ones. Perianth color, sepals and petals as in staminate flowers; staminodes 6, carpels 6, glabrous, style short, stigma subterete. Drupelets subglobose, shortly stipitate base on a subglobose torus, the remnant of the style/stigma basal; exocarp moderately coriaceous, ripe fruits bright red, black or bluish black; mesocarp fleshy; endocarp subglobose, cochleate, bilaterally compressed, crustaceous, externally ornamented by a low longitudinal and transverse ridges and or conical projections on the external surface, smooth on the internal surface; condyle bilaterally compressed; seed cochleate (coiled according to Barneby& Krukoff 1971); endosperm scanty, continuous; embryo semi annular (fide Miers 1871), cotyledons [sub] foliaceous, moderately fleshy, appressed.

Distinctive features: Petals auriculate at base; endocarp and seed cochleate, laterally compressed and excavated; drupelets subglobose, shortly stipitate, black to bluish black in *N. diversifolia* (DC.) Lian Lian & Wei Wang.

Distribution: A genus of three species distributed in mainland Asia, southeast Asia, Malaysia, and North America to southern Mexico. *Nephroia diversifolia* is the only species present in the Neotropics in SW Mexico; subtropical forests, woodlands, shrubland, forest edges, and secondary vegetation; 0–1,400 m.

Taxonomic note: The genus *Nephroia*, first described in 1790 was placed as a synonym of *Cocculus* by Diels (1910). The name was recently reinstated by Lian et al. (2020) to accommodate three species formerly placed in *Cocculus* (i.e., *C. carolinus*, *C. diversifolius*, and *C. orbiculatus*), which do not have a close phylogenetic relationship with *C. hirsutus* (L.) W. Theob., the type of *Cocculus*, from which these species differ notably by having 6 carpels (vs. three in *C. hirsutus*), and less prominent abaxial ridges of the endocarps.

ODONTOCARYA Miers, Ann. Mag. Nat. Hist. ser. 2, 7: 35, 38. 1851.

Small to large subwoody, twining vines; branchlets glabrous, rarely pubescent, stems reaching up to 25 m in length and ca. 2 cm in diam., sometimes producing a milky white or cream exudate when cut [e.g., *O. tamoides* (DC.) Miers, *O. tripetala* Diels]; old stems soft, cylindrical, with papery, exfoliating bark, sometimes conspicuously tuberculate; cross section with single cambium, vascular tissue radially dissected by wide rays. Leaves membranaceous to chartaceous, entire or lobed [in *O. tamoides* var. *canescens* (Miers) Barneby], ovate, suborbicular or ovate to elliptic, base cordate, truncate or cuneate, apex acuminate, lustrous, glabrous, papillose-puberulous to scabrous on both surfaces, basifixed, often 3–7-palmatinerved, less frequently pinnatinerved, sometimes with domatia in the axils of main veins and of secondary veins, tertiary veins reticulate or reticulate-scalariform; petioles pulvinate at both ends, more conspicuous and twisted at the base. Staminate inflorescences axillary or cauliflorous, pseudoracemose, simple or 2–3-branched (Barneby 1970), solitary or fasciculate; perianth cream, green, white, or greenish white. Staminate flowers pedicellate; sepals 6, in two unequal whorls, membranaceous; petals often 6, sometimes 3, free, sub-fleshy, stamens (1)3–6, free or fused into a synandrium, but the outer three often free beyond the middle, anthers with longitudinal dehiscence (transverse in *O. tripetala*). Pistillate inflorescences axillary or cauliflorous, in simple or 2-branched racemes; perianth color as in staminate ones. Sepals and petals as in staminate flowers; staminodes 3–6, carpels 3, glabrous, style short, stigma subulate or trifid. Drupelets ellipsoid, slightly compressed, sessile on a subglobose torus, the remnant of the style/stigma apical; exocarp moderately coriaceous, ripe fruits yellow; mesocarp fleshy; endocarp ellipsoid, dorsiventrally compressed, asymmetrical, appearing boat-shaped, crustaceous, moderately smooth or variously ornamented on the external surface, smooth on the internal surface, 3-toothed at the apex and sometimes also at the base; condyle convex; seed

Odontocarya tripetala, photo by R. Ortiz.

subglobose, molded into a concave-convex shape by the intruding endocarp; endosperm weakly adaxially ruminate; embryo with foliaceous cotyledons, divaricate or partially imbricate.

Distinctive features: Old stems with papery exfoliating bark; endocarp dorsiventrally compressed, asymmetrical, frequently boat-shaped, variously ornamented, and 3-toothed at the apex and base.

Distribution: A genus of 36 species distributed from Mexico to southern Brazil including the Lesser Antilles, Panama, Colombia, Venezuela, Guyana, Suriname, French Guiana, Ecuador, Peru, Bolivia, Paraguay, and Argentina, but most diverse in the Amazon region and foothills of the Andes; tropical and subtropical forests; 0–2,100 m.

RUPERTIELLA Wei Wang & R. Ortiz, Molec. Phylog. Evol. 136: 51. 2019.

Large twining lianas; branchlets pubescent, conspicuously lenticellate; old stems with successive cambia. Leaves chartaceous to subcoriaceous, entire, basifixed, elliptic to broadly elliptic or sub-obovate, base obtuse to rounded, apex acute to acuminate, sparse setulose abaxially, 3–5-palmatinerved, the midrib with 2–3 pairs of secondary veins, tertiary veins reticulate-scalariform, veinlets conspicuously prominent on both surfaces; petioles pulvinate, the distal one more conspicuous. Staminate inflorescences supra-axillary, solitary or several together, cymes or cymose-paniculate, flowers pedicellate, perianth green or yellow. Sepals 6, in two moderately unequal whorls, the inner whorl tomentulose abaxially and distally adaxially, both whorls sub-fleshy; petals 6, free, broadly obovate, very

Rupertiella boliviana, from D. Smith 3891 (MO).

scarcely fleshy, enclosing the opposite filaments; stamens 6, filaments free, anthers erect, with longitudinal dehiscence. Pistillate inflorescences and flowers unknown. Fruiting pedicels conspicuously lenticellate. Drupelets sub-ellipsoid, shortly stipitate when immature, later sessile on a subglobose torus, the remnant of the style/stigma subapical; exocarp coriaceous, ripe fruits unknown; mesocarp fleshy; endocarp sub-ellipsoid, woody, scarcely bilaterally compressed, weakly ornamented by impressed veins on the external surface, internal surface smooth; condyle bilaterally compressed, obliquely, adaxially intruding the J-shaped seed and embryo; endosperm strongly fully ruminate, cotyledons subterete, moderately fleshy, appressed.

Distinctive features: Branchlets and fruiting peduncles conspicuously lenticellate; leaf blades with tertiary veins reticulate-scalariform, veinlets conspicuously prominent on both surfaces, endocarp woody, sub-ellipsoid, weakly ornamented by impressed veins on the external surface, and cymose staminate inflorescences.

Distribution: A genus of a single species [*R. boliviana* (Krukoff & Moldenke) Wei Wang & R. Ortiz] distributed in Ecuador, Peru, Bolivia, and Brazil; lowland forests to cloud forests; 110–1,500 m.

SCIADOTENIA Miers, Ann. Mag. Nat. Hist. ser. 2, 7: 37, 43. 1851.

Large twining lianas or scrambling shrubs; branchlets pubescent, lenticels lacking or faint, old stems slender or thickened, cylindrical or flattened (e.g., *S. toxifera*), attaining 20 m in length; cross section with successive cambia (*S. toxifera*) or with single cambium where vascular elements are dissected by wide rays into radial plates. Leaves chartaceous, entire, ovate, base cuneate, obtuse, rounded, truncate, weakly cordate,

Sciadotenia toxifera, photo by M. Huamán.

apex cuspidate lustrous adaxially, glabrous or sparsely to densely pubescent abaxially, basifixed, 3–5(–7)-palmatinerved, secondary veins arising above/below the middle of the blade, tertiary veins scalariform; petiole pulvinate on both ends, the distal one more conspicuous. Staminate inflorescences axillary, racemose, narrowly spiciform, narrowly or broadly paniculate; perianth cream, white, yellow, or pale green. Sepals 9–24, sub-membranaceous, in 3–8 unequal whorls, these graduated, forming a cone; petals 6, free, membranaceous or fleshy, clawed or not, not enclosing the filaments; stamens 6, filaments free or coherent forming a synandrium, anthers with longitudinal dehiscence (or oblique fide Diels 1910), frequently appearing transverse due to the inward bending of filaments, sometimes with a distally protruding connective. Pistillate inflorescences axillary, paniculate, in clustered short, few-flowered racemes or flowers solitary; perianth color as in staminate flowers. Sepals 9, in 3 unequal whorls, forming a cone; petals 6; staminodes absent (3 in *S. toxifera*); carpels frequently 6 (9–15 in *S. cayennensis* Benth.), pubescent, style conspicuous, stigma subulate uncinate. Fruiting pedicels lacking lenticels. Drupelets obovoid or subglobose-reniform, sessile on elongated carpophores, these radiating from a shortly fused base, the remnant of the style near base; exocarp coriaceous, ripe fruits red or orange; mesocarp fleshy; endocarp obovoid or subglobose-reniform, bilaterally compressed, woody or crustaceous, ornamented by low ridges or striate on the external surface, internal surface smooth; condyle likely bilaterally compressed; seed lacking endosperm, embryo hippocrepiform or sub-annular, cotyledons subcylindrical, strongly fleshy, appressed.

Distinctive features: Leaves with scalariform tertiary veins; drupelets on elongated, radiating carpophores.

Distribution: A genus of 19 species distributed from Panama to Bolivia, including Colombia, Venezuela, Guyana, Suriname, French Guiana, Peru, Ecuador, and Brazil; moist or wet forests; 0–1,100 m.

TELITOXICUM Moldenke, Brittonia 3: 42. 1938.

Large twining lianas, sometimes with sympodial (tendril-like) twining branches; branchlets pubescent to glabrescent, old stems cylindrical, asymmetrical or flattened, reaching 20 or more m in length; cross section with successive cambia. Leaves coriaceous to subcoriaceous, entire, elliptic to oblong-elliptic, glabrous on both surfaces, base acute, cuneate, obtuse to rounded, apex acute, acuminate, or cuspidate, basifixed, pinnatinerved, tertiary veins scalariform; petiole pulvinate at both ends, the distal one more conspicuous. Staminate inflorescences axillary, in racemes or narrow panicles; flowers pedicellate or sessile; perianth greenish or white. Sepals 6, membranaceous, equal or unequal; petals 6, free, membranaceous, not enclosing the filaments, stamens 6, filaments free, anthers with longitudinal dehiscence. Pistillate inflorescences and perianth color as in the staminate ones. Sepals 6, membranaceous, unequal, petals 6, membranaceous; staminodes 6; carpels 3, pubescent, style obsolete, stigma lingulate, sessile. Drupelets oblongoid, sessile on a subglobose torus, the remnant of the style/stigma near base; exocarp coriaceous, ripe fruits unknown; mesocarp fleshy; endocarp oblongoid, woody, ornamented by impressed veins externally, smooth in the inner surface, condyle bilaterally compressed; seed hippocrepiform, endosperm strongly fully ruminate, embryo hippocrepiform, cotyledons linear, moderately fleshy, appressed.

Telitoxicum sp., photo by R. Ortiz.

Distinctive features: A combination of pinnatinerved leaves with strongly pulvinate petioles and oblongoid drupelets.

Distribution: A genus of 8 species found in Colombia, Venezuela, Guyana, Suriname, French Guiana, Ecuador, Peru and Brazil; moist or wet forests; 30–550 m.

UNGULIPETALUM Moldenke, Phytologia 1: 279. 1938.

Slender, short, twining vines; roots bearing elongated tubers; branchlets glabrous, old stems slender; cross section, with a single cambium. Leaves chartaceous, entire, ovate or equilateral-triangular, lustrous and sparsely pubescent on both surfaces, base cordate or truncate, apex acute to acuminate, 3–5-plinerved, tertiary veins reticulate-scalariform; petioles inconspicuously pulvinate. Staminate inflorescences cymose paniculate; flowers pedicellate; perianth greenish. Sepals 9, membranaceous, unequal; petals 6, free, bilobed, clawed at base, membranaceous; stamens 6, fused to about half their length, anthers with longitudinal dehiscence, with a non-protruding connective. Pistillate inflorescences cymose; perianth, color unknown. Sepals 12; petals 6, ovate or hastate-sagittate, clawed at base, glabrous; staminodes absent; carpels 6–9, densely villous, style long, conspicuous, terete, stigma linguiform. Drupelets, endocarps, and embryos unknown.

Ungulipetalum filipendulum, photo by J. Braga.

Distinctive features: Roots bearing elongated tubercles and petals bilobed.

Distribution: A genus of a single species [*U. filipendulum* (Mart.) Moldenke] known from a few collections from Espírito Santo, Brazil; rain forest on hillsides and coastal areas (*restingas*); 0-600 m.

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PICTURE VOUCHERS

Figure 1.
A. *Odontocarya* sp. (Acevedo 14449).
B. *Hyperbaena hassleri* Diels. (Acevedo 16751).
C. *Cissampelos pareira* L. (Acevedo 16768).
D. *Anomospermum* sp. (Acevedo 14342).
E. Menispermaceae indet. (Acevedo 16984).

Figure 2.
A. *Anomospermum* sp. (Acevedo 14285).

Figure 3.
A. Menispermaceae indet. (no voucher).
C. *Abuta sp.*(no voucher).

Figure 4.
A. *Disciphania lobata* Eichler. (R. Ortiz 477).
B. *Abuta* sp. (no voucher).
C. *Odontocarya* sp. (Acevedo 17026).
D. *Disciphania hernandia* (Vell.) Barneby (Acevedo 16483).

Figure 5.
A. *Elissarrhena longipes* Miers (no voucher).
B. *Disciphania domingensis* Urb. sp. (R. Ortiz & Pruski 354).
C. *Hyperbaena* sp. (no voucher).

Figure 6.
A. *Chondrodendron tomentosum* Ruiz & Pav. (no voucher).
B. *Cissampelos pareira* L. (no voucher).
C. *Disciphania domingensis* Urb. (R. Ortiz & Pruski 353).

Figure 7.
A. *Cissampelos tropaeolifolia* DC. (R. Ortiz 535)
B. *Anomospermum* sp. (Acevedo 14342).
C. *Odontocarya* sp. (Acevedo 17026).

D. *Sciadotenia mathiasiana* Krukoff & Barneby (R. Ortiz et al. 478).

Figure 8.
A. *Borismene japurensis* (Mart.) Barneby. (R. Rojas 470).
B. *Odontocarya perforata* Barneby (W. Palacios 13516).
C. *Disciphania smithii* Barneby (Neill 13627ª).
D. *Abuta panamensis* (Standl.) Krukoff & Barneby (Burger 12041).
E. *Caryomene foveolata* Barneby & Krukoff. (Zarucchi 3160).
F. *Cissampelos andromorpha* DC. (R. Ortiz 263).

Figure 9.
A. *Odontocarya tripetala*. Diels (Huamán 292).
B. *Elissarrhena longipes* Miers (R. Ortiz 243).
C. *Curarea iquitana* (Diels) R. Ortiz (R. Vásquez 21737).
D. *Cissampelos tropaeolifolia* DC. (R. Rojas 3520).

Figure 10.
A. *Disciphania smithii* Barneby (R. Rojas 4364).
B. *Cissampelos tropaeolifolia* DC. (R. Rojas 3520).
C. *Elissarrhena longipes* Miers (R. Ortiz 243).
D. *Odontocarya truncata* Standl. (McPherson 11762).
E. *Abuta rufescens* Aubl. (R. Ortiz 344).
F. *Chondrodendron tomentosum* Ruiz & Pav. (J. Perea 27645).